

Status of the NIST Facility for Spectral and Total Directional Emittance Measurements

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A new facility is being built at the National Institute of Standards and Technology (NIST) for the measurement of spectral and directional emittance of materials in the infrared. This facility will complement existing NIST capabilities in characterization of sample optical properties, which now encompass specular and directional-hemispherical reflectance and transmittance in the infrared spectral region. Currently the facility concept includes realization of the following four main systems, sharing the same optical table and many of the optical and electronic components:

- (A) Blackbody system for providing reference for direct sample emittance measurement, covering the temperature range from 450 K to 1400 K in dry air and inert gas purge;
- (B) Spectral comparator and integrating sphere reflectometer for measurement of spectral and total directional emissivity of opaque and semi-transparent samples at temperatures from 450 K to 1400 K in dry air and inert gas purge;
- (C) Gonio-reflectometer for measurement of spectral directional emittance of opaque and semi-transparent specular samples at temperatures up to 1500 K in vacuum or high purity purge;
- (D) Controlled background reflectometer-emissometer for measurement of emittance and radiance of opaque and semi-transparent samples at temperatures from 250 K to 800 K in the near and middle IR spectral ranges.

This paper reports on the progress of the project realization as well as some refinement of the facility concept, which have taken place since the first report on this project [1]. Results of the first measurements of the infrared spectral emittance of samples, characterization of components such as the optical system and reference blackbody source system and preliminary uncertainty budget estimates will be presented.

1. L.M. Hanssen, S.G. Kaplan, S.N. Mekhontsev, Proc. of 8th Intern. Symposium on Temperature. and Thermal. Measurements in Industry and Science, TEMPMEKO'01, PTB, Berlin, Germany, 265-270, (2001).